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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/529,896 | 12/27/2005 | Masanori Sakai | 2342-0140PUS1 | 2272 |

2292 7590 01/31/2008
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| EXAMINER |
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CHANDRA, SATISH

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| ART UNIT | PAPER NUMBER |
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1792

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| NOTIFICATION DATE | DELIVERY MODE |
|-------------------|---------------|

01/31/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

| | | | |
|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/529,896 | Applicant(s) SAKAI ET AL. | |
| | Examiner Satish Chandra | Art Unit 1792 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3- 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3 - 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>4/05, 12/05, 12/06, 9/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3 – 6 and 8 - 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (US 2002/0073923) in view Lam et al (US 2004/0008336) and Oh et al (US 2001/0029891).

Saito et al disclose:

Regarding claims 1 and 8, a substrate processing apparatus comprising:

A reaction chamber 11 (Fig 1)

An exhaust port 61 (Para 0099) for exhausting gases from the reaction chamber

A gas supply system 35a, 35b, 35c and 35d for supplying at least a plurality of reaction gases (such as DCS, SiH₂Cl₂ and ammonia, Para 0093, 0094) to the reaction chamber wherein the gas supply system comprises:

A cleaning gas supply unit, 35d (Para 0097) for supplying cleaning gas (such as HF, Para 0097) to the reaction chamber

Post-processing gas supply units (reaction gas supply units) 35a, 35b for supplying post processing gas exclusively through the gas supply pipes (nozzles) 31a, 31b, 31c in the reaction chamber (Para 0093, 0094, 0095 and 0097) wherein each of the reaction gases supplied from the post processing gas supply units remove the element remaining in the exclusive supply nozzles and the reaction chamber and form a desired film in the reaction chamber.

A controller 75 for controlling the function of all the valves 35a to 35d, 36a and 36b and controls the temperature of each part of the apparatus (Para 0122, 0124).

Regarding claim 3, each of the reaction gases supplied from said post-processing gas supply unit removes the element remaining in said exclusive supply nozzles and said reaction chamber, and the reaction gases form a desired film in said reaction chamber. It is the intended use of the apparatus and the apparatus of Saito et al is capable of supplying reaction gases from the said post-processing gas supply unit to remove the element remaining in the said exclusive supply nozzles and the said reaction chamber and the reaction gases form a desired film in the said reaction chamber.

Regarding claims 5 and 6, the cleaning gas (source 35 d, fig 1) is a gas (HF) containing fluorine and the gas including silicon is the first gas DCS (SiH_2Cl_2 , Para 0093).

Regarding claim 9, a heater 16 (Fig 2, Para 0089) surrounding the circumference of the reaction tube 11. Setting the temperature in the reaction container when the plurality of reaction gases are supplied after the cleaning gas is supplied and before a substrate is processed lower than the temperature in the reaction container when the cleaning is carried out is the intended use of the apparatus. And the apparatus of Saito et al is capable of performing such functions.

Saito et al do not disclose:

Regarding claims 1 and 8, the controller controlling the post-processing gas supplying the post-processing gas after the cleaning gas is supplied to the said container and before the substrate is placed in the container,

Lam et al discloses:

Regarding claims 1 and 8, an alternate method of determining the seasoning state of a plasma processing system, wherein cleaning process is completed first before the seasoning process (Para 0067) and before the first substrate is brought in the chamber,

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to program the controller of Saito et al to implement the cleaning step before the seasoning step as taught by Lam et al. It would have been obvious to a skilled artisan to combine prior art elements to yield predictable results such as programming the controller of Saito et al to implement the cleaning step before the seasoning step as taught by Lam et al.

The motivation for cleaning step followed by the seasoning step is to trap any adsorbed gases or ions on the inside of the chamber and prevent contamination of the subsequently deposited films.

Saito et al and Lam et al do not disclose:

Regarding claims 1 and 8, the said controller controls the post-processing gas supply unit to supply each of the reaction gases alternately from the exclusive supply nozzles.

Regarding claims 4 and 10, a plasma generating device wherein the gases are activated.

Oh et al disclose:

Regarding claims 1 and 8, a gas flow controller (not shown) installed at the gas supply pipes is controlled on time basis, so that the activated H₂O vapor and the trimethyl aluminum gas are repeatedly supplied into the chamber alternately (Para 0080).

Regarding claims 4 and 10, two remote plasma generators 350a, 350b (Fig 3) for exciting the process gases (Para 0060, 0062).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the controller of Saito et al and Lam et al with the controller of Oh et al to alternately supply reaction gases from the exclusive supply nozzles in the apparatus of Saito et al and Oh et al as taught by Oh et al. It would have been obvious to a skilled artisan to combine the prior art elements to yield predictable

results such as supplying process gases alternately in the apparatus of Saito et al and Lam et al as taught by Oh et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a remote plasma generator in the apparatus of Saito et al and Lam et al to excite process and/or cleaning gases. It would have been obvious to a skilled artisan to combine the prior art elements to yield predictable results such as providing a remote plasma generator for the purpose of exciting gases in the apparatus of Saito et al and Lam et al as taught by Oh et al.

The motivation for replacing the controller of Saito et al and Lam et al with the controller of Oh et al is to alternately supply reaction gases from the exclusive supply nozzles in the apparatus of Saito et al and Lam et al to form layers of desired film on the substrate.

The motivation for providing a remote plasma generator in the apparatus of Saito et al and Lam et al to excite process and/or cleaning gases.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (US 2002/0073923) in view of Lam et al (US 2004/0008336) and Oh et al (US 2001/0029891) as applied to claims 1, 3 – 6 and 8 - 10 above and further in view of Choi et al (US 6,279, 503).

Saito et al, Lam et al and Oh et al do not teach if the cleaning gas is NF₃ or CIF₃.

Choi et al disclose: CIF₃ as the cleaning gas (Column 4, lines 34 – 37).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use CIF₃ as the cleaning gas in the apparatus of Saito et al, Lam et al and Oh et al as taught by Choi et al.

The motivation for using CIF₃ gas as a cleaning gas is that it is an alternate and equivalent cleaning gas for cleaning the pipe lines, nozzles and the chamber walls as taught by Choi et al.

Response to Arguments

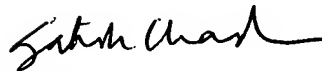
Applicant's arguments with respect to claims 1, 3 - 10 have been considered but are moot in view of the new ground(s) of rejection. The Examiner agrees that both the Saito et al and Lam et al do not teach supplying each of the reaction gases alternately from the exclusive supply nozzles. However, a new reference, Oh et al teaches a gas flow controller to alternately supply activated H₂O vapors and trimethyl aluminum gas into the chamber. Therefore it would have obvious to a skilled artisan to combine prior art elements to yield predictable results such as supplying reaction gases alternately from the supply nozzles in the apparatus of Saito et al and Lam et al.

Conclusion

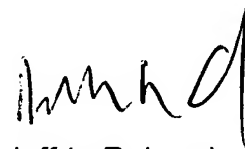
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish Chandra whose telephone number is 571-272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, Primary Examiner, Jeffrie R. Lund can be reached on 571-272-1437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Satish Chandra



Jeffrie R. Lund
Primary Examiner

SC
1/16/2008